

# SKW103 Datasheet

## 2x2 MIMO WLAN Module

### Document Information

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## 1 General Description

The SKW103 module includes an 802.11n MAC and baseband, a 2.4GHz radio and FEM, a 650MHz MIPS CPU, a 2-port 10/100 fast Ethernet switch. Solution for low power, low-cost, and highly integrated AP router and consumer electronic devices, the module requires only an external 3.3V power supply. It supports 802.11n operating up to 144Mbps for 20 MHz and 300Mbps for 40 MHz channel respectively, and IEEE 802.11b/g data rates.

The module supports bridge mode and AP Client mode and Gateway mode. The high performance Module can process advanced applications effortlessly, such as routing, security and VoIP. It also includes a selection of interface to support a variety of applications, such as a USB port for accessing external storage and 3G/TLE modem. Especially in the IOT, a wide range of applications.

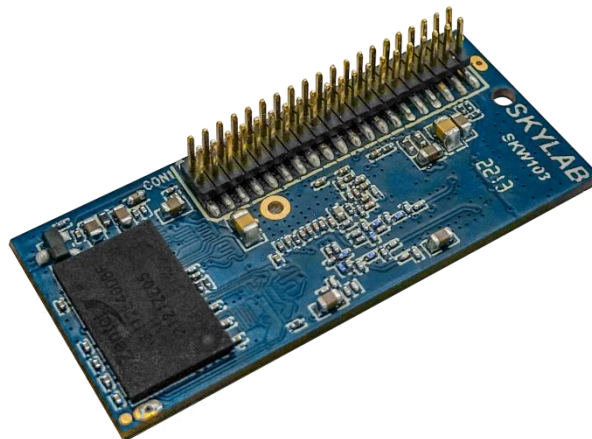


Figure 1: SKW103 Top View

## 2 Applications

- ◆ USB WiFi Camera
- ◆ IOT (internet of things)
- ◆ WiFi AP
- ◆ 3G/4G Wi-Fi Router
- ◆ WiFi Repeater
- ◆ Building Automation
- ◆ Home Automation
- ◆ Smart Home Gateway
- ◆ Industry Control

### 3 Features

- ◆ Compliant to IEEE 802.11b/g/n
- ◆ 2T2R mode with support for a 300Mbps PHY data rate
- ◆ DDR2 memory up to 1024Mb
- ◆ Flash memory up to 256Mb
- ◆ 1 LAN ports and 1 WAN port
- ◆ Support USB 2.0 slave device for USB disk and USB 3G/4G dongle and USB camera
- ◆ Security: WEP64/128, TKIP, AES, WPA, WPA2, WAPI
- ◆ Support AP/Client/Router mode
- ◆ ROHS compliance meets environment-friendly requirement
- ◆ Conform to FCC/CE/IC/ROHS certification standards
- ◆ 41.2(L) x 18.5(W) x 9.0(H) mm small dimension

## 4 Application Block Diagram

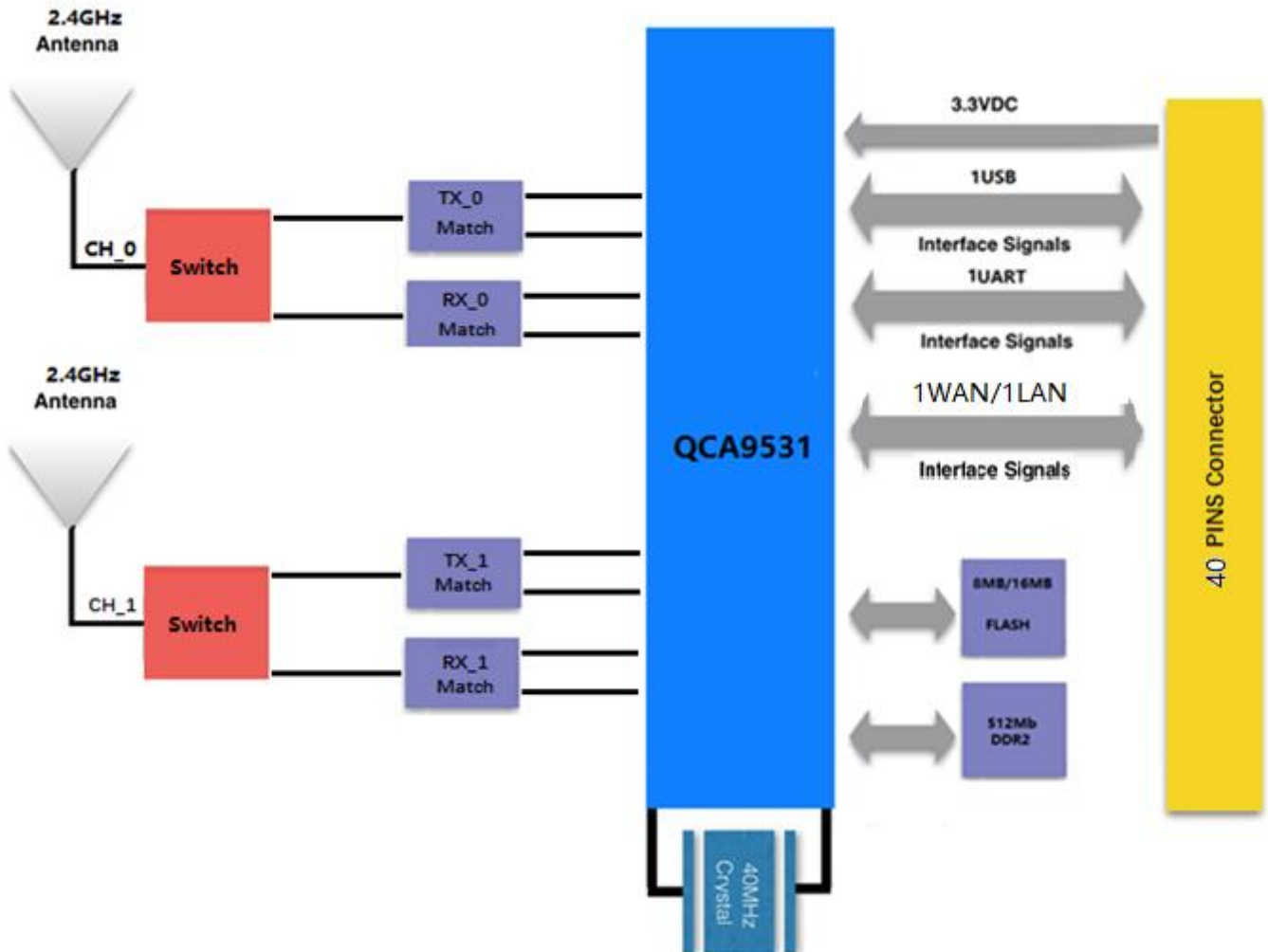


Figure 2: SKW103 Block Diagram

## 5 Interfaces

### USB

The USB interface support USB slave devices for USB disk and USB 3G/4G dongle and USB camera.

### UART

The UART default baud rate is 115200bps.

## GPIO

| SKW103 Pin Number | GPIO   | Description                   | Share function |
|-------------------|--------|-------------------------------|----------------|
| 4                 | GPIO0  | GPIO0                         |                |
| 6                 | GPIO1  | GPIO1                         |                |
| 8                 | GPIO2  | GPIO2                         |                |
| 10                | GPIO3  | GPIO3                         |                |
| 24                |        | RESET_CONFIG                  |                |
| 26                | GPIO17 | JUMPSTART                     |                |
| 34                | GPIO4  | LED7/WAN LED, do not pull up. | LED            |
| 33                | GPIO16 | LED6/LAN1 LED                 |                |
| 20                | GPIO13 | LED1/SYSTEM LED               |                |
| 35                | GPIO12 | LED0/Wireless LED             |                |

## WAN/LAN

The SKW103 module integrates 5-port 10/100Mbps fast Ethernet switch.

## 6 Module Specifications

| Hardware Features  |  |
|--------------------|--|
| Model              | SKW103                                   |
| Antenna Type       | IPEX                                     |
| Chipset solution   |  |
| Voltage            | 3.3V±5%                                  |
| Dimension(L×W×H)   | 41.2mm*18.5mm*9.0mm                      |
| Wireless Features  |  |
| Wireless Standards | IEEE 802.11b/g/n                         |
| Frequency Range    | 2.412-2.484GHz                           |
| Data Rates         | IEEE 802.11b : 1,2,5.5,11Mbps            |
|                    | IEEE 802.11g : 6,9,12,18,24,36,48,54Mbps |
|                    | IEEE 802.11n : MCS0--MCS7 @ HT20         |
|                    | MCS0--MCS7 @ HT40                        |

|                      |  |
|----------------------|--|
| Receiver Sensitivity | HT40 MCS7 : -69dBm@10% PER(MCS7)           |
|                      | HT20 MCS7 : -71dBm@10% PER(MCS7)           |
|                      | 54M: -75dBm@10% PER                        |
|                      | 11M: -88dBm@ 8% PER                        |
| Modulation Technique | DSSS (DBPSK, DQPSK, CCK)                   |
|                      | OFDM (BPSK, QPSK, 16-QAM, 64-QAM)          |
| Wireless Security    | WPA/WPA2, WEP, TKIP and AES, WPS2.0, WAPI  |
| Transmit Power       | IEEE 802.11n: 13-16dBm @HT20/40 MCS7       |
|                      | IEEE 802.11g: 14-17dBm @54MHz              |
|                      | IEEE 802.11b: 16-20dBm @11MHz              |
| Work Mode            | Bridge/Gateway/AP Client                   |
| <b>Others</b>        |  |
| Certification        | ROHS                                       |
| Environment          | Operating Temperature: -20°C~70°C          |
|                      | Storage Temperature: -40°C~85°C            |
|                      | Operating Humidity: 10%~90% non-condensing |
|                      | Storage Humidity: 5%~90% non-condensing    |



## 7 Module Pinout and Pin Description

### Module Pinout

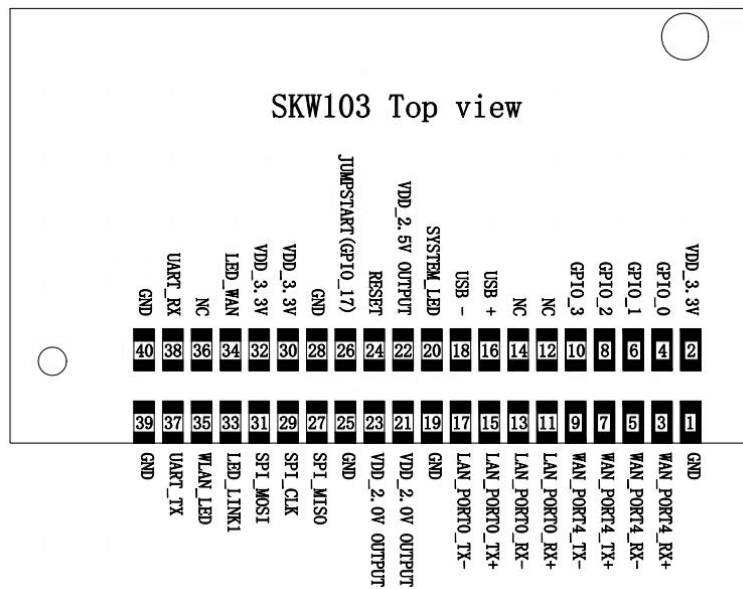


Figure 3: SKW103 Pin Package

### Pin Description

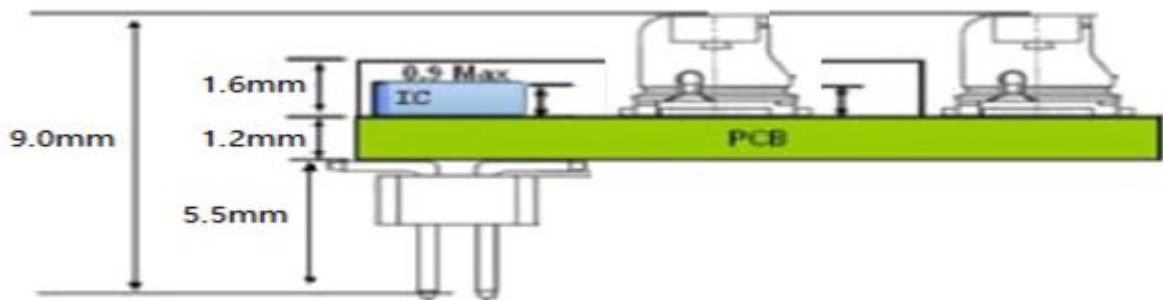
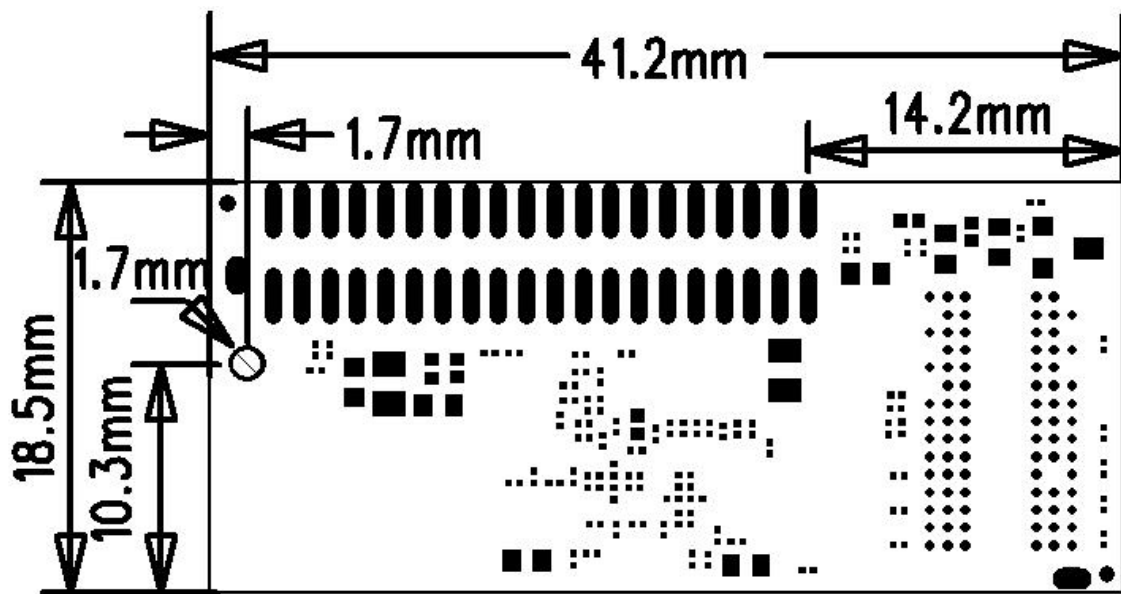
| Pin No. | Pin name      | Description  |
|---------|---------------|--|
| 1       | GND           | Ground   |
| 2       | VDD_3.3V      | 3.3V input 1000mA, recommended voltage 3.3V, Min2.97V, MAX 3.63V |
| 3       | WAN_PORT4_RX+ | Ethernet Wan port  |
| 4       | GPIO_0        | GPIO#0   |
| 5       | WAN_PORT4_RX- | Ethernet Wan port  |
| 6       | GPIO_1        | GPIO#1   |
| 7       | WAN_PORT4_TX+ | Ethernet Wan port  |
| 8       | GPIO_2        | GPIO#2   |
| 9       | WAN_PORT4_TX- | Ethernet Wan port  |
| 10      | GPIO_3        | GPIO#3   |
| 11      | LAN_PORT0_RX+ | Ethernet port  |

|    |                        |  |
|----|------------------------|--|
| 12 | NC                     | NC   |
| 13 | LAN_PORT0_RX-          | Ethernet port  |
| 14 | NC                     | NC   |
| 15 | LAN_PORT0_TX+          | Ethernet port  |
| 16 | USB +                  | USB signal, carries USB data to and from the USB 2.0 PHY   |
| 17 | LAN_PORT0_TX-          | Ethernet port  |
| 18 | USB -                  | USB signal, carries USB data to and from the USB 2.0 PHY   |
| 19 | GND                    | Ground   |
| 20 | SYSTEM_LED             | System LED, GPIO#13  |
| 21 | VDD_2.0V OUTPUT        | Power supply output for peripheral network transformer   |
| 22 | VDD_2.5V OUTPUT        | GPIO voltage output for LED  |
| 23 | VDD_2.0V OUTPUT        | Power supply output for peripheral network transformer   |
| 24 | RESET                  | It has an internal 10k pull-up resistance, and trigger while Pulling down  |
| 25 | GND                    | Ground   |
| 26 | JUMPSTART<br>(GPIO_17) | Resets the firmware to its default configuration, KEY_INPUT to start WPS function, it has a internal 10k pull-up resistance, and |
| 27 | SPI_MISO               | SPI serial interface   |
| 28 | GND                    | Ground   |
| 29 | SPI_CLK                | SPI serial interface   |
| 30 | VDD_3.3V               | 3.3V input 1000mA, recommended voltage 3.3V, Min2.97V, MAX 3.63V   |
| 31 | SPI_MOSI               | SPI serial interface   |
| 32 | VDD_3.3V               | 3.3V input 1000mA, recommended voltage 3.3V, Min2.97V, MAX 3.63V   |
| 33 | LED_LINK1              | Port #0 activity LED, GPIO#16  |
| 34 | LED_WAN                | WAN LED, GPIO#4, <b>do not pull up to VDD_3V3</b>  |
| 35 | WLAN_LED               | Wireless LED, GPIO#12  |
| 36 | NC                     | No Connect   |

|    |         |                          |
|----|---------|--------------------------|
| 37 | UART_TX | Serial data out, GPIO#10 |
| 38 | UART_RX | Serial data in, GPIO#9   |
| 39 | GND     | Ground                   |
| 40 | GND     | Ground                   |

**WARNING:** GPIO4 do not pull up to VDD\_3V3.

## 8 PCB Footprint and Dimensions



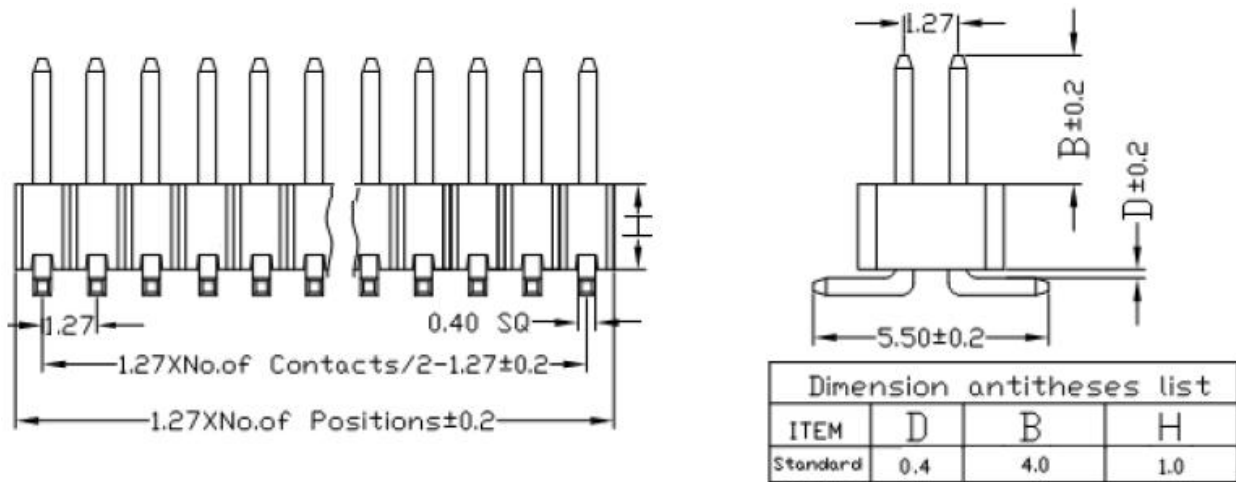


Figure 4: SKW103 Recommend PCB Footprint

## 9 Electrical Characteristics

### a) Absolute Maximum Ratings

Table9-1: Absolute Maximum Ratings

| Parameter                 | Condition | Min  | Typ. | Max. | Unit |
|---------------------------|-----------|------|------|------|------|
| Storage temperature range |           | -40  |      | 125  | °C   |
| ESD Protection            | VESD      | /    |      | 2000 | V    |
| Supply voltage            | VDD_3.3V  | 0    |      | 3.6  | V    |
| Voltage on any I/O pin    |           | -0.3 |      | 3.63 | V    |

SKW103 series modules are Electrostatic Sensitive Devices and require special precautions while handling.



### ESD precautions

The SKW103 module contain highly sensitive electronic circuitry and are Electrostatic Sensitive Devices (ESD).

Handling the SKW103 module without proper ESD protection may destroy or damage them permanently.

The SKW103 module are electrostatic sensitive devices (ESD) and require special ESD precautions typically applied to ESD sensitive components. Proper ESD handling and packaging procedures must be applied throughout the processing, handling, transportation and operation of any application that incorporates the SKW103 module. Don't touch the module by hand or solder with non-anti-static soldering iron to avoid damage to the module.

## b) Recommended Operation Ratings

Table9-2: Operating Conditions

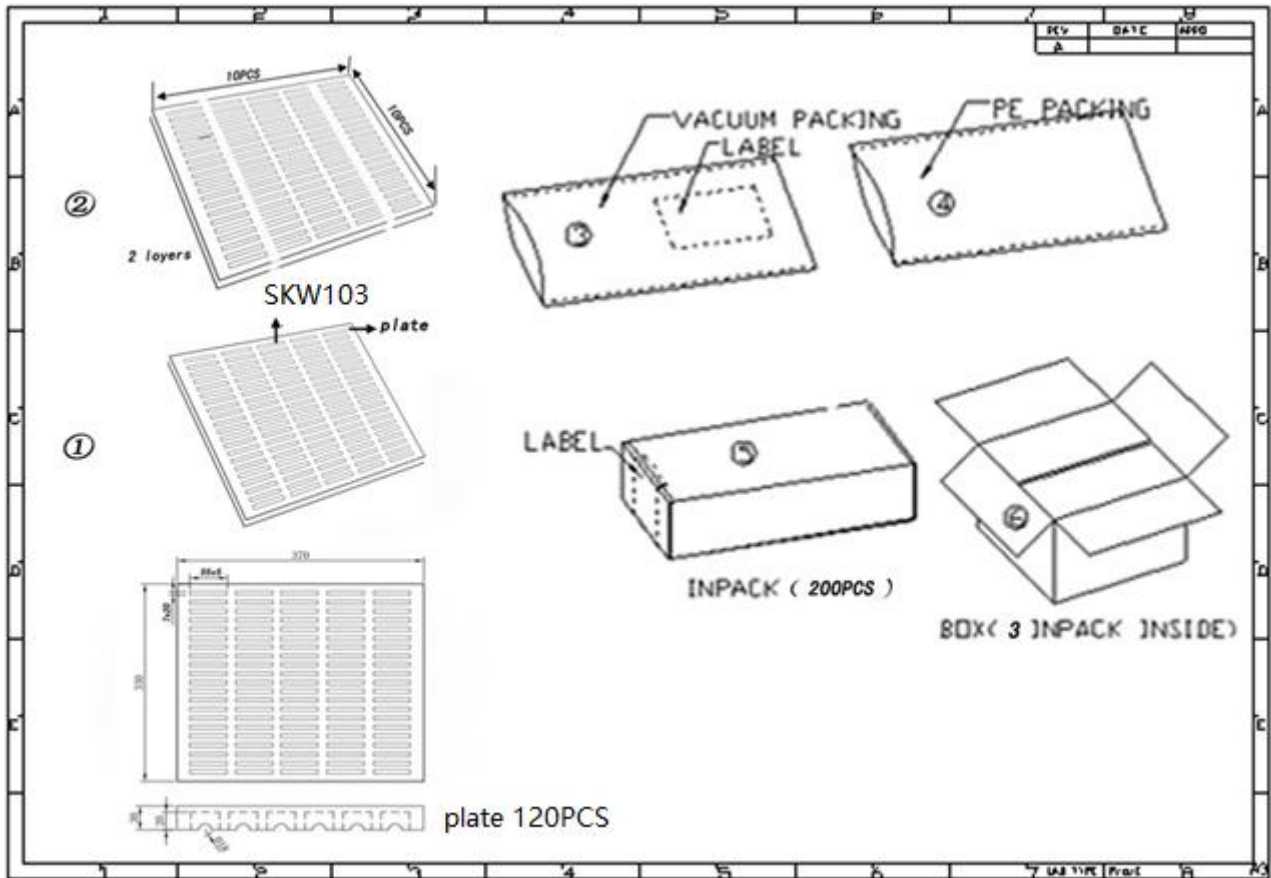
| Parameter            | Symbol   | Minimum | Typical | Maximum | Unit |
|----------------------|----------|---------|---------|---------|------|
| Extended temp. range | TA       | -20     |         | 70      | °C   |
| Power Supply         | VDD_3.3V | 3.14    | 3.3     | 3.46    | V    |
| Input Low Voltage    | VIL      | -0.3    |         | 0.8     | V    |
| Input High Voltage   | VIH      | 2       |         | 3.63    | V    |

## c) Measurement Conditions

Table9-3: Power Consumption in Different States

| System state                             | Current (Typ.)@3.3V | Current (Max.)@3.3V |
|--|---------------------|---------------------|
| Standby                                  | 180 mA              | 210 mA              |
| Transmit (2.4g; +15 dBm @ TX HT20 MCS7.) | 400 mA              |                     |
| Transmit (2.4g; +18 dBm @ 11b 11Mbps.)   | 580 mA              | 685 mA              |

## 10 Packaging Specification



## 11 Ordering Information

| Module No.  | SPI Flash Size | DDR2 Size   |
|-------------|----------------|-------------|
| SKW103_E85  | 8M Bytes       | 512M bites  |
| SKW103_E81  | 8M Bytes       | 1024M bites |
| SKW103_E165 | 16M Bytes      | 512M bites  |
| SKW103_E161 | 16M Bytes      | 1024M bites |
| SKW103_E325 | 32M Bytes      | 512M bites  |
| SKW103_E321 | 32M Bytes      | 1024M bites |

## 12 Contact Information

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